

Labadie Heat Calculations - Kleinfelder

Based on Model Run Fig. 1 in Supplemental Report.

1879	Qe = Effluent Flow 001 cfs	
117	Te = effluent Temperature F	
23652	Qs = Stream Flow in cfs	
87	Ts = Stream Temperature F	
0.07360	M1 = (Qe/ (Qs + Qe))	This is flawed, should be Qe/Qs. Plant removes Qe from river
	When Ts < 80F	
0.07747	M2 = 0.00005275(Te - Ts) ² - 0.00544551(Te - Ts) + 0.19336524	
	When Ts is 80F to 85F	
0.07579	M2 = 0.00005275(Te - Ts) ² - 0.00544551(Te - Ts) + (-0.000200 Ts + 0.209365)	
	When Ts is >85F	
0.04588	M2 = (-0.00001055*Ts + 0.00094950)(Te - Ts) ² - (-0.00108910*Ts + 0.09801913)(Te - Ts) + (-0.	
	Percent Mixing Zone = (0.1857 * ln(M1/M2) + 0.234)*100)	
22.44638	Ts < 80F	
22.85543	Ts is 80F to 85F	
32.17534	Ts is 85F to 90F	
	TDP	
0.94994	Ts < 80F	
0.97110	Ts is 80F to 85F	
1.60409	Ts is 85F to 90F	

, then returns it. Net Qs is not increased by the discharge.

03847303*Ts + 3.46257232)

Labadie Heat Calculations - Kleinfelder Fixed Operating Parameters, Temperature range.

1879	1879	1879	1879	1879	1879	1879	1879	1879	1879
109	110	111	112	113	114	115	116	117	118
23652	23652	23652	23652	23652	23652	23652	23652	23652	23652
79	80	81	82	83	84	85	86	87	88

0.07360	0.07360	0.07360	0.07360	0.07360	0.07360	0.07360	0.07360	0.07360	0.07360
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0.07747

0.07739	0.07719	0.07699	0.07679	0.07659	0.07639	0.07619
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0.16824	0.15295	0.13765	0.12236	0.10706	0.09177	0.07647	0.06118	0.04588	0.03059
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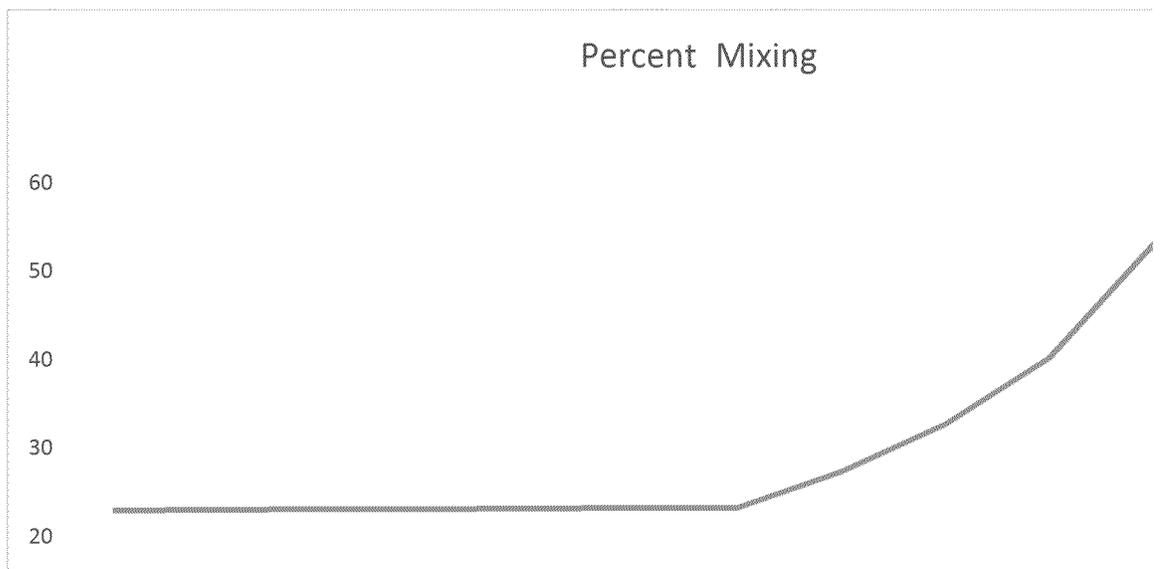
22.44638

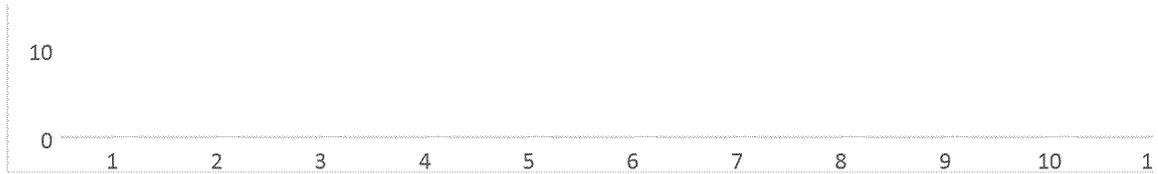
22.46747	22.51552	22.56370	22.61201	22.66044	22.70899	22.75768			
8.04640	9.81635	11.77295	13.96026	16.44003	19.30273	22.68862	26.83265	32.17534	39.70569

0.94994

0.95102	0.95349	0.95596	0.95845	0.96096	0.96347	0.96600			
0.43745	0.48119	0.53466	0.60150	0.68743	0.80201	0.96242	1.20304	1.60409	2.40624

22.44638	22.51552	22.56370	22.61201	22.66044	22.70899	22.75768	26.83265	32.17534	39.70569
0.94994	0.95349	0.95596	0.95845	0.96096	0.96347	0.96600	1.20304	1.60409	2.40624





1879 1879 Qe = Effluent Flow 001 cfs
 119 120 Te = effluent Temperature F
 23652 23652 Qs = Stream Flow in cfs
 89 90 Ts = Stream Temperature F

0.07360 0.07360 M1 = (Qe/ (Qs + Qe)) This is flawed, should be Qe/Qs. Plant removes Qe from river

When Ts < 80F

$$M2 = 0.00005275(Te - Ts)^2 - 0.00544551(Te - Ts) + 0.19336524$$

When Ts is 80F to 85F

$$M2 = 0.00005275(Te - Ts)^2 - 0.00544551(Te - Ts) + (-0.000200 Ts + 0.209365)$$

When Ts is >85F

$$0.01529 - 0.000004 M2 = (-0.00001055 * Ts + 0.00094950)(Te - Ts)^2 - (-0.00108910 * Ts + 0.09801913)(Te - Ts) + (-0.$$

$$\text{Percent Mixing Zone} = (0.1857 * \ln(M1/M2) + 0.234) * 100$$

Ts < 80F

Ts is 80F to 85F

52.58004#NUM! Ts is 85F to 90F

TDP

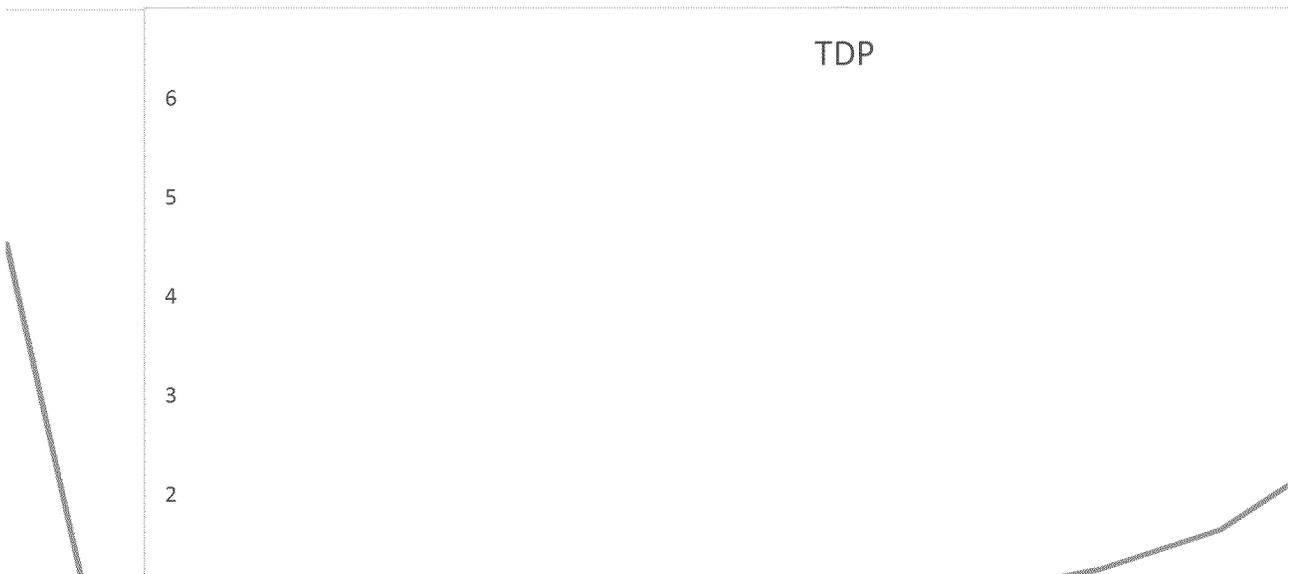
Ts < 80F

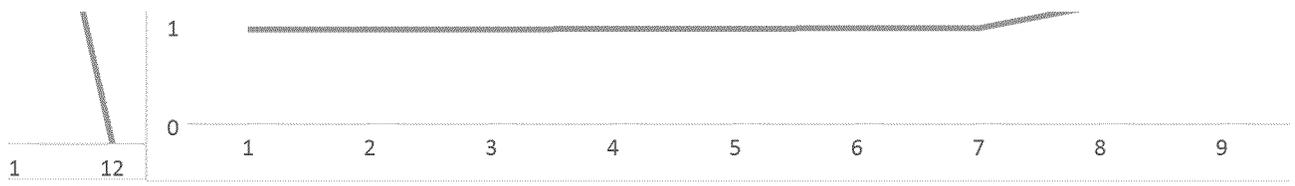
Ts is 80F to 85F

4.81316195.51493 Ts is 85F to 90F

52.58004#NUM! Percent Mixing, values grouped

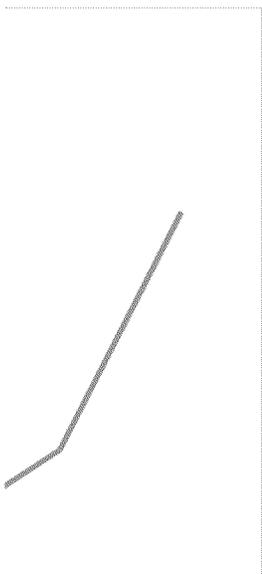
4.81316195.51493 TDP, values grouped





, then returns it. Net Qs is not increased by discharge.

$$03847303 * T_s + 3.46257232)$$



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